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CASE STUDY

Prototyping collaborative relationships between design and healthcare experts: mapping the patient journey

Stephen D. Reay[a,b], Guy Collier[b], Reid Douglas[b], Nick Hayes[b], Ivana Nakarada-Kordic[b], Anil Nair[c] and Justin Kennedy-Good[b,c]

[a]School of Art & Design, AUT University, Auckland, New Zealand; [b]Design for Health and Wellbeing (DHW) Lab, Auckland City Hospital, Auckland, New Zealand; [c]Auckland District Health Board, Auckland, New Zealand

ABSTRACT

This case study presents the first project undertaken in a recent in-hospital design collaboration – the Design for Health and Wellbeing Lab (DHW Lab). Specifically, we explore some of the challenges and opportunities associated with designing a journey map for the Adult Emergency Department, the DHW Lab's first opportunity to put co-design into practice. The intention and outcome of this project was as much about designing a journey map prototype as it was about building the interdisciplinary relationships that would help enable future successful design-led collaborations. As such, the notion of prototyping was applied to both generate artefacts to communicate care pathways to patients and families, as well as a way to build and test collaborative relationships between designers and clinical staff. The outcomes of the project resulted in new products to help patients and families negotiate a complex emergency department as well as gaining insight into how to bring people from different backgrounds together to start a design-led conversation around a culture of care within a hospital.

Introduction

Collaboration is increasingly seen as a touchstone of contemporary 'innovation' practices in health care. The Design for Health and Wellbeing (DHW) Lab, a collaboration between AUT University's Faculty of Design and Creative Technologies and the Auckland District Health Board (ADHB), is a co-design (and co-design*ed*) studio located within Auckland City Hospital, New Zealand, since 2013. It was established with the vision of providing innovative, interdisciplinary approaches to developing products, services, systems and experiences for the improved health and wellbeing of our population. As a mixed discipline studio specializing in design-led research and delivering solutions across

communication, digital and environmental design, the emphasis of the Lab is on doing and making, experimenting and reflecting (organically and often informally) using collaborative processes (Reay et al. 2016). One of the DHW Lab's primary objectives is to encourage users with little or no experience in design (e.g. patients, families and hospital staff) to collaborate and positively contribute to the design process.

Although the hospital's intention and willingness to collaborate with designers has been made abundantly clear through the sheer demand of the DHW Lab's skillsets and resources, designers and researchers at the Lab have, nevertheless, found that there are a number of boundaries and challenges to genuine collaboration between different fields of knowledge. Recent projects have revealed that different areas of expertise often have profoundly different methods, values, theoretical approaches, even conceptions of what counts as knowledge. The difficulty arises not from differences in expertise so much as differences in *culture*. As Bauer puts it:

> disciplines differ in epistemology, in what is viewed as knowledge, and in opinion over what sort of knowledge is possible. They differ over what is interesting and what is valuable. And the practitioners of the various disciplines have characteristically different attitudes and habits and manners–that is, they differ over matters that might at first seem quite unrelated to the practice of their disciplines. (1990, 106).

Various attempts to include users and stakeholders in the design process have, since about the 1970s, given rise to a number of approaches that could be described as co-creation or co-design (Sanders and Stappers 2008). Today there are a great number of ways of practising and thinking about these approaches. While it is not our aim to describe them in any depth, it will suffice to say here that we are in agreement with Sanders and Stappers (2008, 6) who see co-creation as that which refers to 'any act of collective creativity, i.e. creativity that is shared by two or more people', and co-design as 'the creativity of designers and people not trained in design working together in the design development process'. This latter definition is particularly relevant to the activities of the DHW Lab, which aims to draw in outsiders with no experience in design (such as patients, families and hospital staff) and to provide them with the tools and environment necessary to make meaningful contributions to the design process.

As noted above, this understanding of design as a collaborative process – that is, as an approach that engages with stakeholders and end-users to meet their needs – is by no means new. What is relatively new, however, is that this is increasingly associated with social innovation, often through interdisciplinary lab-like spaces such as the DHW Lab. Some scholars have even suggested that policy-makers and politicians are beginning to see co-creation and co-production as *necessary* to innovative solutions (Voorberg, Bekkers, and Tummers 2014). Central to these innovation practices is prototyping, because models,

artefacts are a powerful means of assisting people to see what *could be*, of communicating a shared vision, and of giving shape to the future (Sanders 2013). Murray, Caulier-Grice, and Mulgan (2010) recognize the social significance of refining and testing ideas through prototyping, particularly with respect to the ways in which prototypes contribute to social innovation. This is because, they write, 'it's through iteration, and trial and error, that coalitions gather strength (for example, linking users to professionals) and conflicts are resolved (including battles with entrenched interests)' (Murray, Caulier-Grice, and Mulgan 2010, 12).

The patient journey map brief was the DHW Lab's first opportunity to put co-design into practice, and to 'prototype' a collaborative partnership between designers and hospital staff in the Adult Emergency Department (AED). Indeed, both the intention and outcome of this brief was as much about designing a journey map prototype as it was about building the interdisciplinary relationships required to 'make things happen' at the DHW Lab (Bill, Reay, and Collier 2015). Thus, co-designing the journey map at the DHW Lab was an opportunity to both test and critically reflect on the factors that enable (and possibly hinder) genuine collaboration between designers and hospital staff, and to use that learning to inform how the DHW Lab as a whole should operate in the future.

The patient journey map

Mapping the patient pathway is an important tool that has emerged in recent years from a tradition of health service redesign (Mould, Bowers, and Ghattas 2010). With a range of functions and using a variety of media, the patient pathway map is an effective tool that reduces a sophisticated whole – e.g. a complex health service and its procedure – to a comprehensible representation of its major elements, including the relationship between them, for a general audience (Mould, Bowers, and Ghattas 2010).

Emergency department (ED) is a complex service that processes many different care pathways, all of which depend on complex factors such as the severity of the patient's condition – or 'triage' – and the kinds of assessments and treatments they require. When patients arrive at ED, they often experience long waiting times without any discernible justification and become frustrated or anxious as a result. Although the waiting room may seem quiet to patients, there are often higher priority patients arriving unseen to ED by helicopter or ambulance. The existing patient AED information is shown in Figure 1.

ED staff hypothesized that the pathway map would help reduce frustration, anxiety, stress levels and potentially violence by providing patients with a clear and comprehensive picture of the service and its priorities; a tool that would not

Figure 1. Existing patient information in Adult Emergency Department.
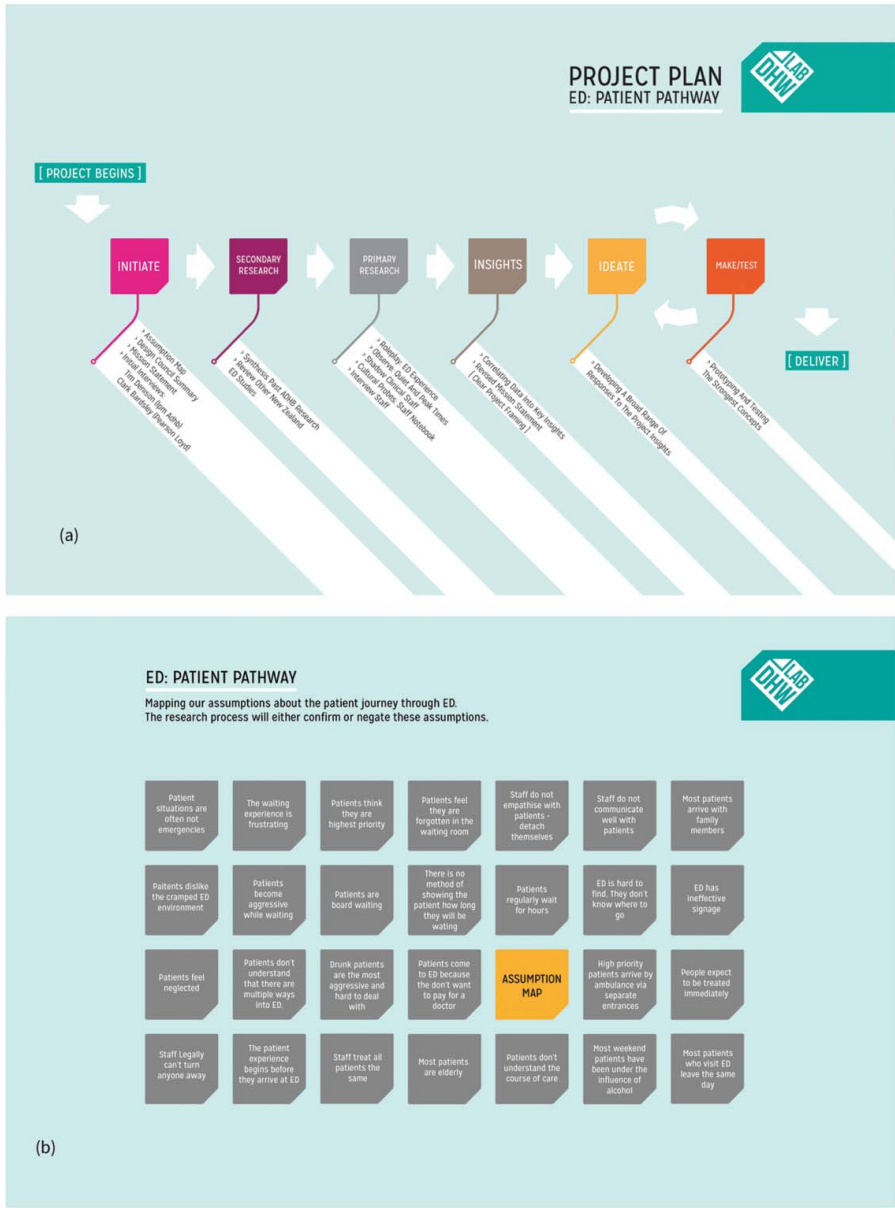
Figure 2. (a) Process map to communicate proposed design process to AED stakeholders; (b) map of initial design team assumptions of AED department

only explain what patients can expect to go through when they arrive, but why they might be forced to wait, even when the service appears to be quiet.

Design process

Our design team proposed using a six-phase co-design method (see Figure 2(a)). These phases are defined in the following sections.

Initiate

The design team mapped out their assumptions about AED. These included assumptions from a human-centred design perspective about how the department might function, what challenges might exist, but also how patients were and why they were visiting the AED (Figure 2(b)). The team also held assumptions about how the collaboration with AED staff might work and how the designers would be viewed in this first project. The AED staff might have assumed that the designers were design students, and that they would simply replicate the outputs of the UK Design Council emergency department project 'Reducing violence and aggression in A&E: through a better experience' (Frontier Economics Ltd. 2013), which the AED stakeholder group brought to the original meeting as reference to what they wanted by way of design solution.

Part of the project initially included the design team communicating their assumptions about the workings of the AED and possible design solution to the AED stakeholder group consisting of a charge nurse, clinical director, charge nurse manager, emergency medicine specialist and nurse consultant. As this was the first formal design project undertaken as part of the DHW Lab, with a group of stakeholders not familiar with working with designers, visual aids – including a design process map (Figure 2(a)) – were shared with the AED stakeholder group.

The design team's intention was to engage the AED stakeholders in co-designing a solution. The AED stakeholder group appeared to have an open mind to trying what was for them a new approach. It was established that they had no experience with a design process. The UK ED Design Council project 'Reducing violence and aggression in A&E: through a better experience' (Frontier Economics Ltd. 2013) – a large and comprehensive piece of work in comparison to what might be possible in this project due to resource availability – was discussed. Consequently, an artefact explaining the process (Figure 2(a)) was produced to help explain the planned design approach. A map of the designer's assumptions about what might be important to patients (Figure 2(b)) was also circulated to the AED stakeholder group, to help communicate the designer team's initial understanding of the problem.

Secondary research

To inform the future design solution, the design team looked at a wide range of emergency department projects undertaken in New Zealand and internationally.

Primary research

This phase included interviewing and 'shadowing' staff from ED to understand the patient admission process from their perspective, and going into the space to observe how patients interact with the service. This included walk through of the AED with key clinicians to help build a shared understanding of how the
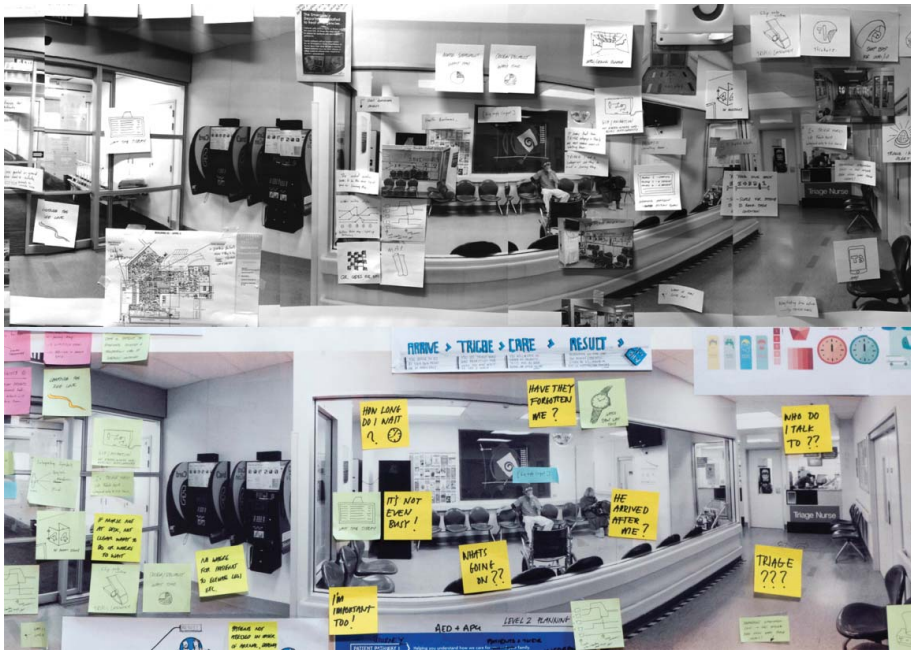
Figure 3. Visual analysis of insights for more effective staff engagement

department/service functioned, and gain insight into the possible pathways a patient might take. From this, a panoramic photographic study (Figure 3) was produced to help capture and communicate a holistic patient experience of the waiting room. This was installed into staff areas to (1) communicate the project and the thinking around it; (2) gain feedback from staff about the insights identified and; (3) provide a platform for staff to easily engage with the design process by suggesting potential ideas or solutions for the design team to consider. In this way, the panoramic photo acted as a working prototype, to share developing ideas and thinking beyond viewing the journey map as a specific outcome, and provided an opportunity for stakeholders to dynamically review the design team's developing understanding of the problem.

An evaluation of patient and visitor wayfinding touch points was also undertaken. This included an assessment of the physical environment, including signage (Figure 4) that may impact on patient and family experiences.

Insights

Through this early research it was identified that there was limited communication regarding what the patient admission process looked like and what might be expected of patients. The clinical service was also found to communicate using rules-based or instructional descriptions for what patients should do and the way things were done in the service. This was especially the case when the design team suggested simplified ways of communicating things, and were met with

Figure 4. Examples of existing AED signage.

reticence to change by the clinical stakeholders; clinical or hospital regulations were put forward as reasons to support the retention of current practice. There were also challenges around the language and terminology used, especially when considering non-English speaking patients. These insights were incorporated into insight sketches to help communicate insights to the service (Figure 5).

Ideate

A number of concepts were developed and quickly mocked up to gain feedback from the AED clinicians (Figure 6). This quickly proved to be a useful way to demonstrate how designers work; the concepts operated as probes that helped the design team gain better understanding of how the clinicians viewed the problem. Fast, roughly produced models/concepts were most effective in getting more constructive generalized feedback on the overall approach, as specific (and often unresolved) details were more energetically critiqued than more resolved sketches. For example, the proposed character icon set (Figure 6), resulted in vigorous debate around ideas of cultural appropriateness, colour and gender of the icons presented. An example of how this process worked can be illustrated by
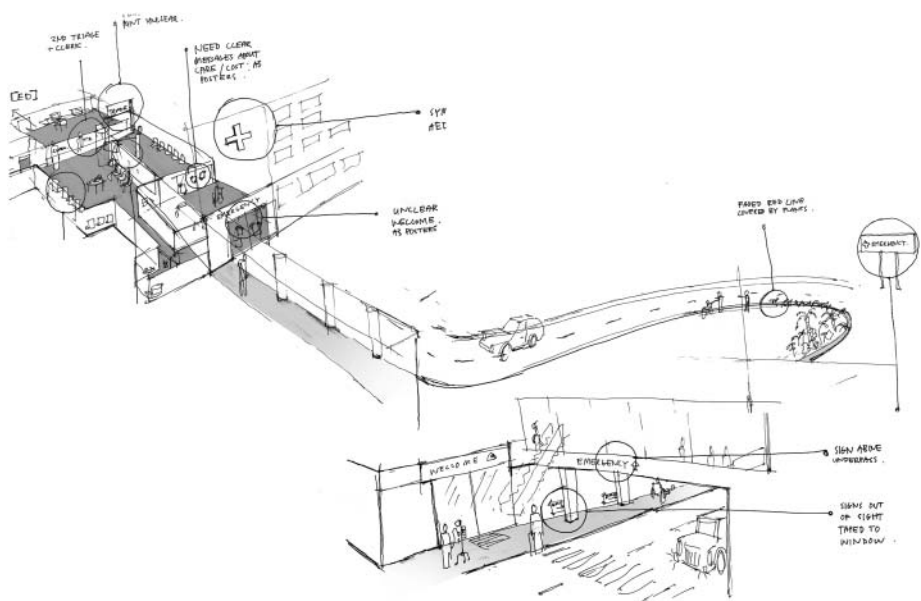
Figure 5. Example of an insight sketch – AED journey to communicate insights associated with patient wayfinding.

reflecting on a sign off meeting with a lead clinician/manager. Instead of discussing the proposed concept, the manager presented an artefact he had prepared that mapped out all the potential pathways a patient might take through the emergency department. This was a staff-friendly document that was process and volume focused, rather than being patient-facing. Consequently, to a person not familiar with the internal workings of an ED it was an overwhelmingly complex
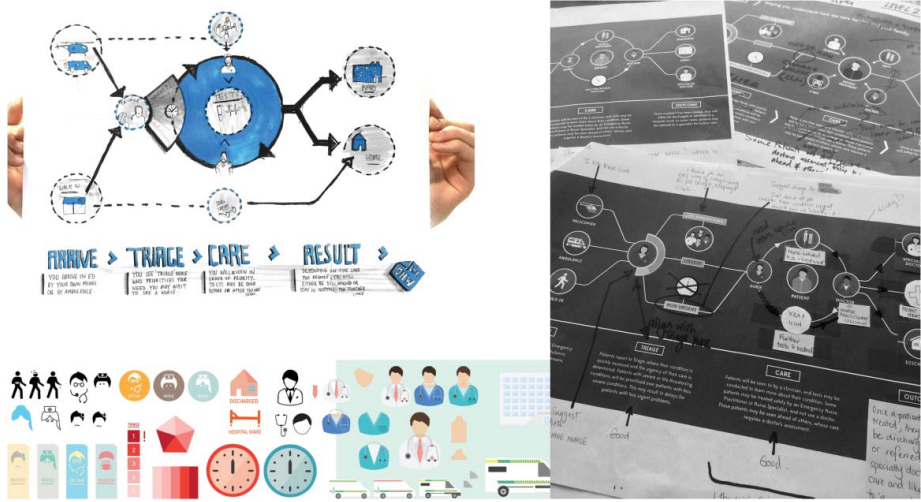
Figure 6. Early concepts used for clinical stakeholder feedback.

Figure 7. A more resolved patient pathway concept as used in evaluation by patients.

flow diagram. It helped to illustrate some of the differences in approach and priority between different stakeholders. The designers were interested in describing the process using familiar language in order to make sense of what happens in the department from the point of view of visitors. They wanted to make the process understandable to patients and families from a range of backgrounds – not something that was medically accurate in every detail and that could only be understood by those with the relevant clinical expertise.

Make/test

The early prototype of the pathway map was printed onto a large piece of paper, and became a source of inspiration for designers and hospital staff to put down ideas for improvement. The map was, in this sense, a 'prototype' for participatory innovation (Boer, Donovan, and Buur 2013) – that is, it not only exposed the hospital staff to the DHW Lab's novel research capabilities and methods, but also helped them to think about the very notion of patient-centredness (Junginger 2008), what it actually means, and its ramifications. For example, clinical staff were able to identify inconsistencies in patient processes, such as procedural flaws, as the early prototypes did not accurately reflect the function of the department. The patient process was initially presented as being too linear and did not adequately reflect the complexity of different patient pathways.

Nurses on the project team were encouraged to participate in the research process by engaging patients to evaluate prototypes (Figure 7). This helped to expose the disconnect between patients' and clinicians' understanding of how the department functioned and what was important to patients and families. This

Figure 8. Final journey map as installed in the adult emergency department waiting room.

exercise was valuable in that it helped clinicians gain empathy for patients and families, and gave them important insight into the experiences of visitors to the AED. An example of this was the use of language. The map stirred debate and reflection around the kind of language that should be used on the map and why. Throughout the project the wording/terminology was the most contested aspect of the project. The supporting text for each step of the process was repeatedly challenged by the clinical stakeholders in comparison to the illustrated detail of the map. There was significant resistance to move from using clinical terminology that conveys specific important meaning, to more patient-centred language. In particular, it was debated whether it was appropriate to use the word 'Triage' – the use of which clinicians considered important to the culture of AED – when research revealed that many patients arriving in AED understood neither the word, nor its purpose. However, through this exercise AED staff came to appreciate that using the word 'nurse' instead of 'triage nurse' in patient facing materials eliminated unnecessary complexity for patients while not comprising meaning.

The latest iteration

The latest iteration of the patient pathway map is an animation based on the original map (Figure 8), which will be installed on digital screens in the waiting room (https://vimeo.com/145316082). The looping animation allows different components of the patient journey to be emphasized one at a time, with short explanations accompanying each icon. In addition to stripping down the pathway into

manageable sized pieces of information, the use of a digital platform has allowed the content to be delivered in a number of different languages.

Because the final two phases, Ideate and Make/Test, are cyclical, as with all co-design outcomes at the DHW Lab, the patient pathway map remains purposefully unresolved. This is to ensure that the product continues to generate feedback for further refinement and improvement, and to maintain the flexibility required to meet changing user needs in the future.

The AED launched a formal process for collecting quantitative and qualitative feedback from patients about their ED experience. The ED survey is sent to all patients, three weeks after their ED visit. One of the key objectives of the survey was to ascertain whether patients understood the complex processes in the ED and had awareness of their waiting times. The survey has received 336 responses to date. The majority of patients (67%) were satisfied with the amount of information provided at the start of the visit and 85.6% felt that the waiting times were as expected or took less time than expected. Whilst no specific feedback was sought about the ED process map, there were comments that it was 'very informative' and 'clear communication'.

In addition to patients, staff have found the board useful in assisting them in describing the ED process in a visual manner. There has also been a lot of positive feedback from visiting dignitaries including the Minister of Health and Chief Executive Officers of other District Health Boards.

Other opportunities

Throughout the project, and especially in the initial stages of the primary research, the designers were able to identify other design opportunities for improved patient experience in the department. For example, the designers were asked to wait in a procedure room that would commonly be used by patients. The room was one of many along a corridor, but was not clearly identifiable. This was because the doors were numbered on the door and the number not easily read unless standing directly in front of it. This provided an opportunity for the design team to prototype and test wayfinding solutions in situ and to once again involve clinical staff in the design process. Being able to identify opportunities to improve the patient experience and to then design physical solutions was a pivotal stage in the relationship between the designers and AED clinicians, as the value of making became apparent. In addition, the designers' 'fresh eyes' to identify a user problem helped clinical staff to view the importance of approaching situations with a patient-centred lens – a stark contrast from the usually high-stress emergency context in which they operate on a daily basis.

One of the challenges for the designers was the expectations that came with the prototyping. While it is relatively simple to create prototype signs for testing, fitting out a department was more complex. In the first instance, a small number of signs were able to be made and installed by the design team for the AED (Figure 9);

Figure 9. Early prototypes (left), final AED door signage (centre) and subsequent bathroom signage for Older Peoples' Health (as part of a falls prevention initiative) (right).

however, when staff from other wards visited they too wanted the design for their departments. The designers made making signs appear to be a simple task, yet the DHW Lab is not a manufacturing facility and does not have the resource to manufacture and install multiple signs. However, the outsourcing of the design ultimately improved both its function and execution. The design was developed to be simpler and a glow-in-the-dark vinyl was used to enhance low light viewing.

In addition to the ED process map, a patient waiting time dashboard has been created to better inform patients of the expected waiting time. The board has used some of the icons and signage from the ED process map and serves to supplement the information available on the static map.

Discussion

By operating inside the hospital, the DHW Lab aims to advance a vision of the future of health care. In this case study, as Bill, Reay, and Collier 2015 suggest, prototypes were used as actors in experimental assemblages to support expert and user mind-sets to explore not only what is, but what could be. As such, in this first DHW Lab project, the design team provided a lens through which the project team could observe the 'taken-for-grantedness' of day-to-day practice in the hospital. Collaborative projects, such as described here, help to critique the status quo by challenging industry conceptions from within (Boer, Donovan, and Buur 2013).

Most of the interactions between designer and clinical staff were through two key clinicians, the nurse manager and the clinical director. Both individuals were very supportive and excited about the project and about engaging with designers for the first time. However, it was difficult at times to set up meetings and review sessions due to the workload and unpredictable nature of the emergency department. The designers were used to moving quite quickly with design iterations and concepts, and were hoping to receive their input relatively promptly. It was also

sometimes difficult for the clinical staff to facilitate patient interaction due to workload. However, when patient feedback was finally gained it was critical for both shaping/refining the design, and helping to get the clinical staff to better understand how the pathway was viewed with uncertainty by patients. It also helped the clinical team envision the potential for change and the DHW Lab to explore the feasibility and effectiveness of new design-led approaches and methods (Reay et al. 2016). Furthermore, the transparent documentation and visual archiving of the project helped to support ongoing learning throughout the design process, as well as helping to reinforce and make more accessible design terminology.

This transparency helped balance expert knowledge with user knowledge, which with the balance between past and future solutions are considered by Steen (2011) as the two main tensions in human-centred design practice. Steen (2011) argues that there is no way to resolve these inherent tensions, but to achieve the ambition of human-centred design of 'being open towards others and of jointly learning and jointly creating' (Steen 2011, 56), designers should manage tensions by critically reflecting on their own role in the distribution of power and agency in the research process.

Through the process of ongoing iteration, experimentation and reflection, the design team (or designing-clinician coalition) gained strength, and differences were able to be more easily resolved (Murray, Caulier-Grice, and Mulgan 2010). The prototyped artefacts contributed to a 'stabilizing narrative' around the AED user journey problem. The different modes of engagement were more easily aligned within the team (designers and clinicians). As a consequence, a new cultural practice to explore hospital-based design problems by emphasizing human-centredness and experimentation was introduced into the department (Bill, Reay, and Collier 2015). Thus, clinical staff came to recognize prototypes as representing processes and principles that differed from the algorithmic and bureaucratized hospital procedures, while the DHW lab began to prototype a network of processional relationships to start a design-led conversation around a culture of care within a healthcare context (Bill, Reay, and Collier 2015).

Acknowledgments

Disclosure statement

Notes on contributors

Steve Reay is a co-director of the Design for Health and Wellbeing (DHW) Lab, and associate professor, School of Art + Design, Auckland University of Technology.

Guy Collier is a researcher at the Centre for Person Centred Research at AUT's Health and Rehabilitation Institute. He has worked as an ethnographer and research assistant at the DHW Lab.

Reid Douglas' work at the DHW Lab ranges from applied areas such as furniture design, way-finding solutions and communication design to helping manage a mixed discipline studio environment.

Nick Hayes is a user experience (UX) designer. His work at the DHW Lab focuses on co-designing digital product experiences for people with mental health conditions, including mild cognitive impairment and psychosis.

Ivana Nakarada-Kordic is a qualitative researcher at the DHW Lab with a background in human factors and health psychology.

Anil Nair (FACEM, MBA) is an emergency medicine specialist and clinical director for the Emergency Department at Auckland City Hospital.

Justin Kennedy-Good is a performance improvement specialist at Auckland DHB. Justin has a particular interest in integrating design tools with performance improvement methods.

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